

CLAIM AMENDMENTS

1. (Currently Amended) An optical transmission module which sends and receives light transmitted bi-directionally through an optical fiber, said optical transmission module comprising:

a light source which radiates light of a first wavelength;

a ~~light-receiving~~ light-detecting section which ~~receives~~ detects light of a second wavelength emitted from said optical fiber; and

a ~~binary-type~~ binary diffractive optical element with a staircase-shaped diffractive surface, which has principal diffractive action of different diffraction orders respectively for the light of ~~said the~~ the first wavelength and the light of ~~said the~~ the second wavelength, wherein said diffractive optical element separates ~~the~~ a first optical axis passing from said light source to ~~said the~~ the optical fiber and ~~the~~ a second optical axis passing from said ~~light-receiving~~ light-detecting section to ~~said the~~ the optical fiber.

2. (Currently Amended) The optical transmission module according to claim 1, wherein said diffractive optical element bends one of the light of ~~said the~~ the first wavelength and the light of ~~said the~~ the second wavelength by a diffraction ~~action~~, and does not bend ~~the other light not bent~~ by performing zero order diffraction ~~action or order 0~~.

3. (Currently Amended) The optical transmission module according to claim 1, wherein said diffractive optical element diffracts the light of ~~said the~~ the first wavelength and the light of ~~said the~~ the second wavelength with diffraction orders of mutually opposite signs, so that the light of ~~said the~~ the first wavelength and the light of ~~said the~~ the second wavelength are bent toward mutually opposite directions.

4. (Currently Amended) The optical transmission module according to claim 1, wherein said diffractive optical element ~~has lens action which~~ converges one of the light of the first wavelength from said light source onto ~~said the~~ the optical fiber, ~~or alternatively has lens action which converges~~ and the light of ~~said the~~ the second wavelength from ~~said the~~ the optical fiber onto said ~~light-receiving~~ light-detecting section, and the light converged has a center of ~~the lens made that is~~ eccentric from one of a straight line passing from said light source to ~~said the~~ the optical fiber ~~or alternatively, and~~ from a straight line passing from ~~said the~~ the optical fiber to said ~~light-receiving~~ light-detecting section.

5. (Currently Amended) The optical transmission module according to claim 1, further comprising a lens which converges and bends light from said light source toward ~~said~~ the optical fiber and converges and bends light from ~~said the~~ the optical fiber toward said ~~light-~~ light-~~receiving~~ light-detecting section, wherein said diffractive optical element has a grating shape, uniform in one direction on an incidence surface on which ~~receives~~ light from said light source is incident.

6. (Currently Amended) The optical transmission module according to claim 1, wherein said diffractive optical element is a ~~transmission-type~~ transmission diffractive optical element.

7. (Currently Amended) The optical transmission module according to claim 1, wherein said diffractive optical element is a ~~reflection-type~~ reflection diffractive optical element.

8. (Currently Amended) The optical transmission module according to claim 2, wherein one of ~~said the~~ the first wavelength and ~~said the~~ the second wavelength is a wavelength ~~of in~~ in a 1.3 μ m wavelength band ~~while and~~ and the other ~~is a wavelength of~~ is in a 1.55 μ m wavelength band, ~~the number of steps in the staircase of said and said staircase-shaped diffractive optical element being equal to or greater than 5 and equal to or less than 8~~ includes at least five steps and no more than eight steps.

9. (Currently Amended) The optical transmission module according to claim 3, wherein one of ~~said the~~ the first wavelength and ~~said the~~ the second wavelength is a wavelength ~~of in~~ in a 1.3 μ m wavelength band ~~while and~~ and the other ~~is a wavelength of~~ is in a 1.55 μ m wavelength band, ~~the number of steps in the staircase of said and said staircase-shaped diffractive optical element being 8~~ has eight steps.

10. (Currently Amended) The optical transmission module according to claim 4, wherein said diffractive optical element comprises a first diffractive optical element and a second diffractive optical element, said first diffractive optical element ~~having lens action that~~ converges the light of ~~said the~~ the first wavelength from said light source onto ~~said the~~ the optical fiber and ~~having transmission action for~~ transmits the light of ~~said the~~ the second wavelength from ~~said the~~ the optical fiber, and said second diffractive element ~~having lens action that~~ converges the light of ~~said the~~ the second wavelength from ~~said the~~ the optical fiber onto said

~~light-receiving light-detecting section and having transmission action for~~ transmits the light of ~~said~~ the first wavelength from said light source.

11. (Currently Amended) The optical transmission module according to claim 4, further comprising a lens which converges and bends light from said light source toward ~~said~~ the optical fiber and converges and bends light from ~~said~~ the optical fiber toward said ~~light-receiving light-detecting~~ light-detecting section, wherein

said diffractive optical element ~~has lens action that~~ converges and bends the light of ~~said~~ the first wavelength from said light source onto ~~said~~ the optical fiber and ~~has transmission action for~~ transmits the light of ~~said~~ the second wavelength from ~~said~~ the optical fiber, or, alternatively,

said diffractive element ~~has lens action that~~ converges the light of ~~said~~ the second wavelength from ~~said~~ the optical fiber onto said ~~light-receiving light-detecting~~ light-detecting section and ~~has transmission action for~~ transmits the light of the first wavelength from said light source.

12. (Currently Amended) The optical transmission module according to claim 10, wherein said first diffractive optical element and said second diffractive optical element are respectively ~~formed~~ disposed on two opposed surfaces of a single member, facing ~~to each other~~ in opposite directions.

13. (Currently Amended) The optical transmission module according to claim 6, wherein said ~~transmission-type~~ transmission optical element is ~~positioned so as to be~~ inclined from an axis perpendicular to the axis connecting said light source and said ~~light-receiving light-detecting section are disposed~~.

14. (Currently Amended) The optical transmission module according to claim 5, wherein said diffractive optical element is ~~formed~~ disposed on a surface of said lens.

15. (Currently Amended) The optical transmission module according to claim 11, wherein said diffractive optical element has eccentric non-spherical converging action ~~as said lens action~~.

16. (Currently Amended) The optical transmission module according to claim 1, wherein said light source and said ~~light-receiving light-detecting~~ light-detecting section are arranged on a

single substrate, said substrate and said diffractive optical element being housed in a single sealed ~~single~~ package.

17. (Currently Amended) The optical transmission module according to claim 16, wherein an ~~electric~~ electrical signal sent to said light source and a ~~received electric~~ an electrical signal received from said ~~light-receiving~~ light-detecting section cancel ~~to~~ each other ~~out~~, so that mutual ~~electric~~ electrical cross talk is eliminated.

18. (Currently Amended) The optical transmission module according to claim 10, wherein one of ~~said the~~ first wavelength and ~~said the~~ second wavelength is a wavelength ~~of~~ in a 1.3 μ m wavelength band ~~while~~ and the other ~~is a wavelength of~~ is in a 1.55 μ m wavelength band, ~~the number of steps in the staircase of said~~ and said staircase-shaped first diffractive optical element ~~being~~ has 5 or 6 steps, and ~~the number of steps in the staircase of said~~ staircase-shaped said second diffractive optical element ~~being~~ has 7 steps.